

# Installation for LS200, LS200N LS200NDVOR Series and L1100 Liquid Level Switches

LS-04006N  
Effective 02-04  
Section 15  
(00-02-0563)

Please read the following instructions before installing. A visual inspection for damage during shipping is recommended before mounting.



## GENERAL INFORMATION

# WARNING

### BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT

- ✓ Disconnect all electrical power to the machine.
- ✓ Make sure the machine cannot operate during installation.
- ✓ Follow all safety warnings of the machine manufacturer.
- ✓ Read and follow all installation instructions.
- ✓ OBSERVE all pressure and electrical ratings and requirements for the devices and the operating environment.
- ✓ BE SURE all pressure HAS BEEN REMOVED from the vessel before opening any pressure connections.



# CAUTION

LS200 Series parts are not interchangeable with other liquid level products. Damage caused by the above mentioned is not covered by our Limited Warranty.

### All Models

**Body:** Nickel plated steel; Optional 316 stainless steel (meets NACE standard MR-01-75 for direct exposure to H<sub>2</sub>S service)  
**Float:** 304 Stainless steel to operate in 0.5 specific gravity or heavier fluids (LS200 Series models only)  
**Pressure Rating:** 2000 psig (13.8 MPa) [138 bar] (LS200 models only)

**O-Ring:** Viton

### LS200

**Process Connection:** 2" NPT  
**Temperature Rating:** -20 to 300°F (-29 to 149°C)  
- Optional -20 to 400°F (-29 to 204°C): (not available with DPDT).  
**Electrical:** SPDT std. (see "Electrical" section for configuration/rating).  
**Wire:** 18 AWG x 36 in. (1.0 mm<sup>2</sup> x 916 mm)

### LS200NDVOR

**Process Connection:** 2" NPT  
**DVO Valve:** 3 way N.C. w/manual operator; all connections 1/8" NPT (minimum 30 psig required)  
**Filter/Pressure Regulator Set:**  
- Regulator: 0 to 75 psig (0 to 517 kPa) [0 to 5.17 bar] range  
- Maximum input pressure: 300 psig (2.07 MPa) [20.7 bar]

### LS200NDV

**Process Connection:** 2" NPT  
**DVO Valve:** 3 way N.C. w/ manual operator; all connections 1/8" NPT

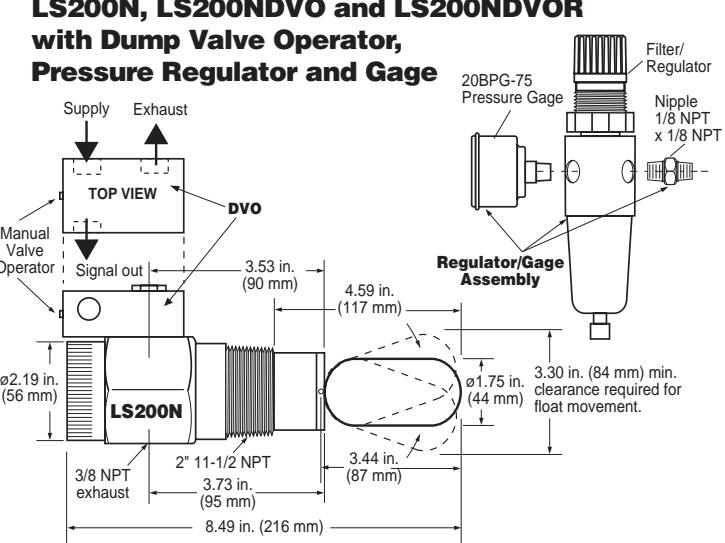
### LS200N

**Process Connection:** 2" NPT  
**Vent Valve:** 2 way N.C. snap action w/ 1/16 in. (2 mm) orifice and Viton seat;  
Inlet: 1/8" NPT; Outlet: 3/8" NPT

### L1100

**Process Connection:** 1-1/2" NPT  
**Pressure Rating:** 1500 psig (10.3 MPa) [103.2 bar]  
**Float:** BUOYGLAS™ operates to 0.5 specific gravity;  
Optional stainless steel to operate in 0.65 specific gravity  
**Electrical:** SPDT switch

## LS200N, LS200NDV and LS200NDVOR with Dump Valve Operator, Pressure Regulator and Gage



## Description

**LS200** Liquid Level Switches with 2" NPT mounting are float activated to operate an electrical SPDT snap switch (optional DPDT on some models) for alarm or shutdown of an engine or electric motor. The LS200 screws directly into the vessel wall and can be used with a weld collar or external float chamber. L1100 models (1-1/2" NPT) are available.

**LS200NDVOR** is a float-activated, pneumatic-vent level device used to operate dump valves or similar devices.

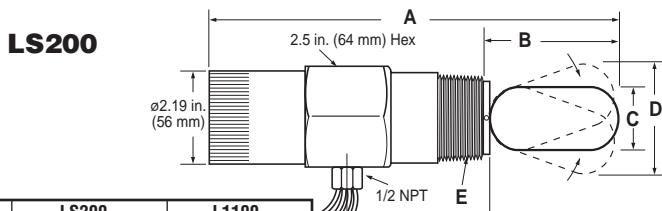
The LS200NDVOR provides a 2" NPT mounting with a pneumatic snap action output for interfacing with pneumatic devices such as our DVU scrubber dump valve or with other pneumatic instrumentation. This unit is supplied with a pressure regulator and filter and Murphy 20BPG pressure gage which is recommended for improved system life and trouble-free operation.

### LS200NDV

Pneumatic level switch with snap action Dump Valve Operator (DVO) without the Pressure Regulator for those applications where the system provides a filter regulator for "instrument quality" air or gas as the control medium.

### LS200N

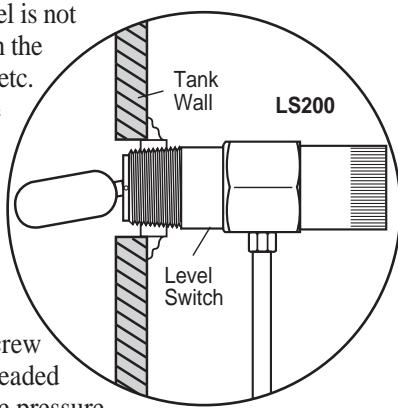
Pneumatic level switch without the DVO and filter regulator.



## PRESSURE VESSEL INSTALLATION: LS200, LS200N and L1100

### Direct Installation into the Wall of the Pressure Vessel

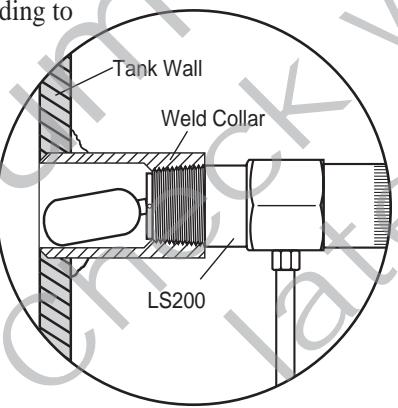
1. Determine that the float travel is not obstructed by the coupling in the vessel wall, internal baffles, etc. Do NOT use more than one float shaft extension P/N 15000478.



2. BE SURE that the float and extension are tight.
3. Before installing the level switch, use of a pipe thread sealant is recommended. Screw the unit directly into the threaded connection in the wall of the pressure vessel.
4. For LS200 and L1100 be sure that the electrical connection is positioned at the bottom.
5. For LS200N the 1/8" NPT pneumatic connection should be on top (the 3/8" NPT vent connection should be on the bottom) for service on a "Trip on Rising" application. The LS200N can be rotated 180° for service on a "Trip on Falling" application.
6. Make the electrical wiring connections according to appropriate wiring diagrams for the alarm or shutdown system to be used. The electrical connection is 1/2"-14 NPT.
7. BE SURE all electrical connections are insulated and the cover is fully installed before reconnecting electrical power.
8. BE SURE all pressure connections are tight before pressurizing the system.

### Installation with a Weld Collar

1. The weld collar, P/N 15050375, must be welded into the wall of the pressure vessel according to code standards and good welding practices.
2. Follow above instructions for installation directly into the wall of the pressure vessel.
3. **NOTE: Weld collar 15050375 can be used ONLY with model LS200.**



### Installation Using External Float Chamber 15051098

1. Install the float chamber 15051098 on the outside wall of the



**CAUTION: USE "NON SPARKING TOOLS.**

pressure vessel using 1" NPT piping or use the mounting surface with a bracket. Position the 2" NPT threaded connection at the height where you want the level switch to operate. The 2" NPT threaded connection must be positioned away from the tank wall.

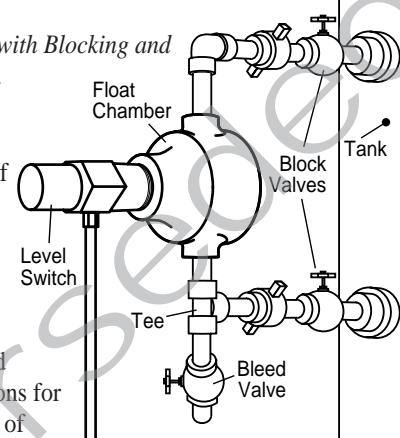
2. A tee and bleed valve are typically installed at the bottom of the lower 1 inch pipe riser to allow draining of the float chamber for servicing or replacement.

**NOTE: A typical installation with Blocking and Bleed valves is shown at right.**

3. Install the LS200 or LS200N/NDVO/NDVOR in the 2" NPT connection of the float chamber.

BE SURE float travel is not restricted and that the float is tight onto the float shaft.

4. To complete installation and wiring, follow the instructions for mounting directly into wall of the vessel and for wiring.



### Pneumatic Models

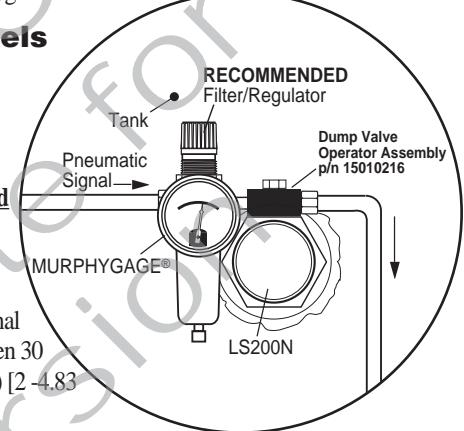
1. All pneumatic models operate on the vent principle.

**The pneumatic signal source must be clean and dry "Instrument Quality" air or natural gas.**

The input pneumatic signal must be regulated between 30 and 70 psi (207-483 kPa) [2-4.83 bar].

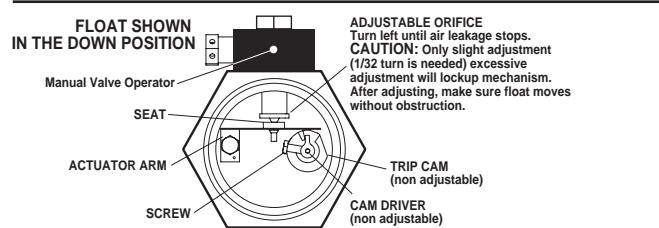
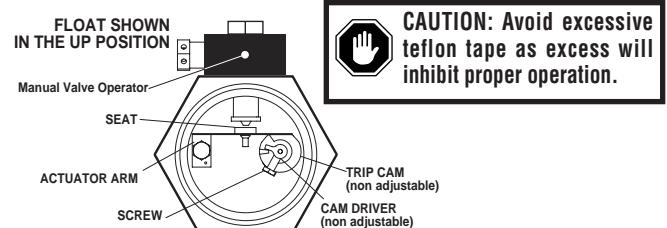
If produced gas is used as the signal source, it should be taken after gas passes through the final scrubber. A suitable filter must be positioned before the LS200NDVO to prevent liquids and/or particulates from entering the dump valve operator.

**NOTE: Check filter periodically for wear and tear and elements that hamper the flow of the pneumatic signal.**



2. All pressure connections must be tight and maintained tight so as not to leak air/gas.

3. Valve seat adjustment can be made if air/gas begins to leak. Care should be taken when adjusting as only slight movement is necessary to stop the leakage; excessive force will bind the seating mechanism. See the instruction below for adjustment.



## REPLACING AND INSTALLING THE DVO ASSEMBLY

When replacing/installing the DVO assembly, tubing and fitting modifications may be required. We suggest removing the LS200NDVO/DVOR from the vessel. Relieve pressure from the vessel or use block valves before removing the LS200NDVO/DVOR.

### Replacing and Installing the DVO Assembly For Models LS200NDVO & LS200NDVOR

**Tools Needed:** Strap or pipe wrench, 9/16" Hex wrench, tubing cutters and benders and the appropriate tools for the fittings.

**NOTE:** Clean, dry instrument quality gas should be used.  
Use of filters will improve service life and reliability.

1. Block off and bleed the instrument gas pressure supply to the LS200NDVO/DVOR.
2. Remove the tubing between the LS200NDVO/DVOR and the scrubber dump valve, and remove the supply gas tubing (regulator [-R-] if used).
3. Remove the LS200NDVO/DVOR from the vessel (optional).
4. If the LS200NDVO/DVOR was removed from the vessel, mount it in a suitable vise on a work bench (if possible).
5. Using the proper tools, disconnect the Inlet, Outlet, and Exhaust fittings from the existing DVO (see **fig. 1**). You will re-connect these to the new DVO in a later step.

**NOTE:** The following steps must be done with the DVO in the upright position (on top of the LS200NDVO).

6. Remove the LS200NDVO/DVOR cover. The use of a strap wrench or a pipe wrench may be needed.
7. With a 9/16" hex wrench loosen the hexhead bolt on top of the DVO and remove the existing DVO from the body.
8. Ensure that the adjustable orifice is fully raised up to ensure when inserted into the body that the actuator arm is not bent. See **fig 2**.
9. Insert the new DVO onto the body. The DVO manual valve operator must face away from the vessel.

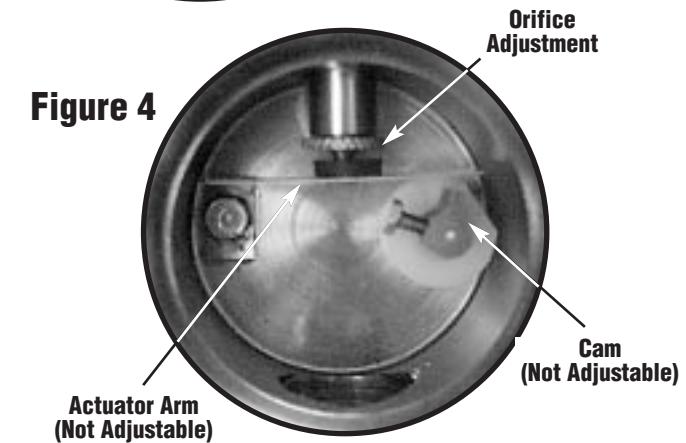
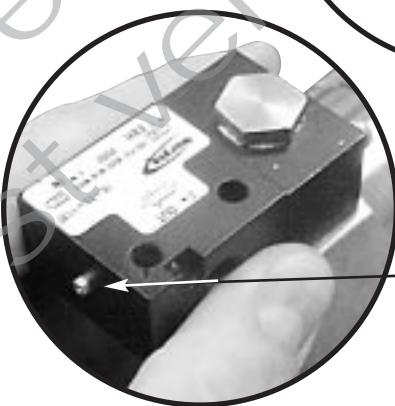
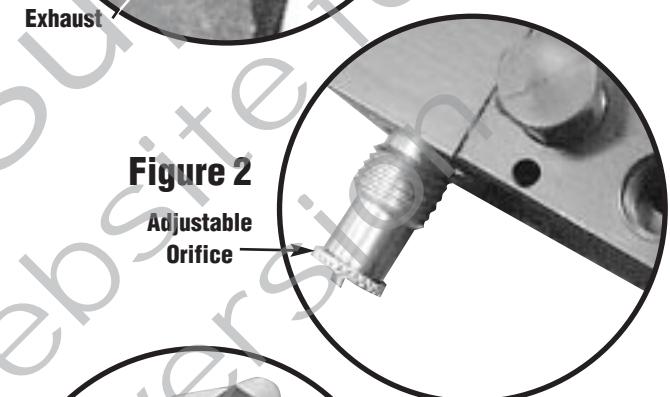
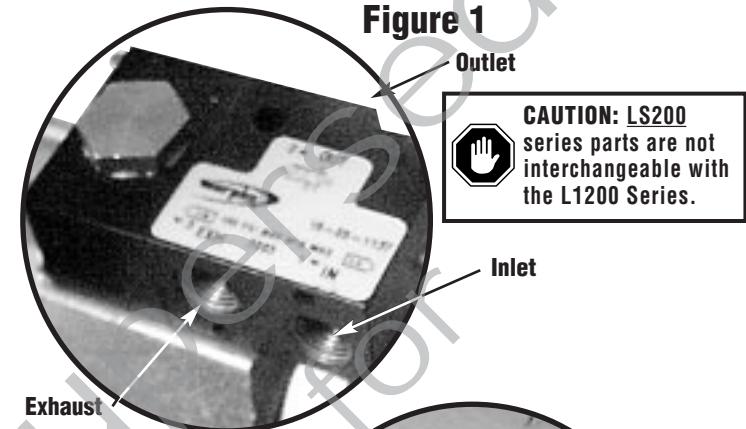


**CAUTION:** Ensure that the actuator arm is not bent during assembly.

10. With the DVO aligned over the hex on the LS200NDVO body, tighten the valve using the 9/16" hex wrench. You may need to hold the DVO while tightening to keep it from rotating. See **fig 3**.
11. The pneumatic input signal should be regulated between 30 and 70 psi for proper setting of the adjustable orifice. With the float in the down position adjust the adjustable orifice down until it touches the seat (see **fig 4**). If the DVO is still leaking make slight adjustments (1/32 turn). Excessive adjustments will lock up mechanisms. After adjusting make sure float moves freely up and down.
12. Replace the LS200NDVO/DVOR cover.
13. Using the appropriate tools re-install the Inlet, Outlet, and Exhaust fittings to the new DVO (see **fig 1**). Thread sealant is recommended but care should be used to not allow excess to enter valve.
14. If the LS200NDVO/DVOR was removed from the vessel re-install it at this time. Thread sealant is recommended.
15. Connect to the Inlet, Outlet, and Exhaust fittings. According to installation drawings.

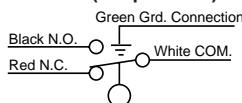


**CAUTION:** LS200 series parts are not interchangeable with the L1200 Series.



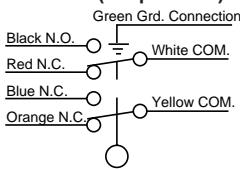
## ELECTRICAL

### SPDT (Snap Switch)



Switch Rating: 5 A @ 125-250- 480 VAC  
1/2 A @ 125 VDC  
1/4 A @ 250 VDC  
2A @ 6-30 VDC Resistive  
1A @ 6-30 VDC Inductive

### DPDT (Snap Switch)



Switch Rating: 10 A @ 125-250 VAC  
1/2 A @ 125 VDC  
1/4 A @ 250 VDC  
10 A @ 6-24 VDC  
Inductive/Resistive



## CAUTION



LS200 Series parts are not interchangeable with other liquid level products. Damage caused by the above mentioned is not covered by our Limited Warranty.

## REPLACEMENT PARTS

Order by part number designation.

### LS200\*

15000479: Stainless Steel float for LS200  
15000124: SPDT snap switch assembly  
15010268: LS200 counter balance assembly  
15000478: Float shaft extension

### LS200N

15000479: Stainless Steel float for LS200N  
15051133: Valve stem  
15010266: Counter balance assembly

### LS200NDVO and LS200NDVOR

55050621: Regulator only  
05706499: 20BPG-D-75 Pressure MURPHYGAGE®  
0-75 psi (517 kPa) [5.17 bar]  
15010267: Assembly (LS200N DVO Assembly)

### L1100

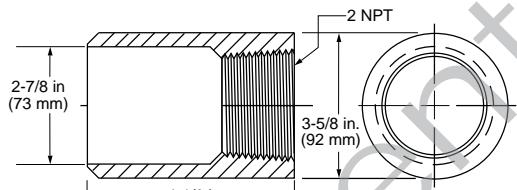
15000893: BUOYGLAS™ float  
15000937: Stainless Steel float  
15000124: SPDT snap switch assembly  
15000213: Counter balance assembly  
15000892: Float shaft extension

\*To maintain hazardous location listings, all other repairs must be made by the factory.

## ACCESSORIES

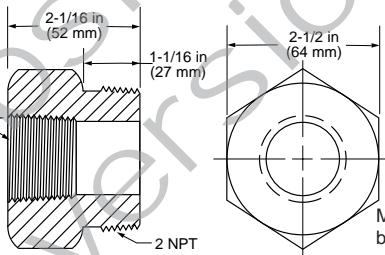
Order by part number designation.

### 15050375: Weld Collar



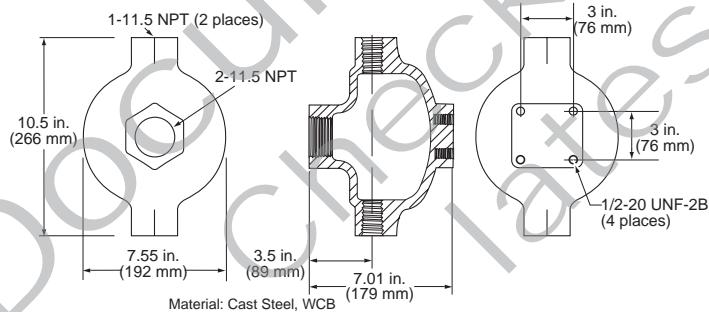
Operating Pressure: 2000 psi (13.8 MPa) [138 bar].  
Operating Temperature: 400°F (204°C).

### 55050617: DVU150/DVU175 Adapter Bushing



Material: 2-1/2 Hex bar stock C.R.S

### 15051098: External Float Chamber



Operating Pressure: 2000 psi (13.8 MPa) [138 bar]. Operating Temperature: 400°F (204°C).



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